Analytical Mechanics, the syllabus

Course	Physics 105, Analytical Mechanics. Spring 2018
Meeting times	MWF 11:45-12:50
Texts	*Classical Mechanics*, John R. Taylor (University Science Books, Mill Valley CA, 2005)
	any calculus-based introductory physics book (e.g., Wolfson)
Website	`physics.stmarys-ca.edu`
Instructor	Mari-Anne M. Rosario
	Galileo 108A 925.631.4837 `mrosario@stmarys-ca.edu`

what are we doing in this class? course description

This course covers the principles of particle dynamics. Topics include rigid body dynamics, Lagrange's equations, Hamilton's principle, wave propagation, and normal modes of vibration in oscillating systems. Prerequisites: Physics 1-4 and Math 39.

This course is an opportunity to gain (1) an intermediate level understanding of classical mechanics, (2) further experience with mathematical techniques used in science and engineering, and (3) confidence in using previously learned material. At the end of this course, students you be able to

- analyze and describe the motion of mechanical systems using the Newtonian framework, including the effects of retarding forces
- identify and analyze systems that exhibit simple harmonic motion, including those with damping and driving forces
- apply approximations to determine behavior in certain limits
- determine the fourier series representation of a function
- analyze mechanical systems using the Lagrangian and Hamiltonian framework

how do i determine what you understand? assessment

The final grade will be based on

Problem sets	18%
In-class work	5%
Computational project	12%
In-class exams	40%
Final exam	25%

Problem sets will be due almost every class meeting. Take the time to *understand what you're doing*, especially if you're working with other people. Ninety-five percent (90%) of the total points will count towards your final grade. For example, if the semester has a total of 200 points, 180 points is needed to get the full 20%.

This course builds on ideas you're already familiar with. In addition to problems specific to this course, there will be problems from prior courses, mostly intro physics and calculus. These review problems are a reminder of what you already know.

Part of our meeting time will involve you actively working on problems. **In-class work** will be graded on quality of effort, correctness and completion. Ninety percent (90%) of the total possible in-class points will count towards your grade.

A **computational project** will be due. Project results are to be presented in a written report and an in-class presentation. More info will be provided later in the semester.

Two **in-class exams** will be given during the semester. Exams will focus on recently covered material, but will assume an understanding of previously covered material. The **final exam** will be comprehensive, but will emphasize material from the latter part of the course.

Extra credit will be offered to attend specific School of Science events. Extra credit can tip your

final grade if it's on the edge between grades. From example, a B can become a B+ due to extra credit. It will not increase your grade between the different letters. For example, a B+ will not become an A- due to extra credit.

go to class or not? attendance, late assignments and make-up exams

There's no way to make up "in-class work" if you're absent, not even if you have a good reason. Late problem sets will be accepted until I (or the grader) starts grading or solutions are posted. After that, problems will not be accepted for any reason.

Conflict or make-up exams will be given only if you (1) provide an acceptable and documented excuse and (2) contact me beforehand. If before isn't possible, then as soon as is reasonable.

Talk to me if there are severe or extended circumstances that affect your performance in class.

this grade doesn't look right? grading policies

In addition to calculations, use text or sketches to explain your solution. A correct answer with no explanation will earn no credit; an incorrect answer with some correct explanation will earn partial credit. Start solutions with definitions of physical quantities (*e.g.* $\vec{v} \equiv \frac{d\vec{x}}{dt}$), physical principles (*e.g.* Newton's laws), or commonly used equations (*e.g.* kinematics equations).

If you believe that there has been a grading error, request a regrade. Resubmit the original, unaltered work within one week, accompanied by a written explanation of what I should consider.

we take this seriously... the academic honor code

This course operates under the premises of the SMC academic honor code.[1] It is expected that everyone will work to uphold high standards of integrity. According to the Code, "Academic dishonesty is a serious violation of College policy because, among other things, it undermines the bonds of trust and honesty between members of the community."

It's common, and often expected, that you'll work with others on assignments (currently as a student, and in the future as a scientist or engineer). What you submit should be your work and reflect your understanding. If you include snippets of other people's work, give them credit.[2] Therefore, **there is no acceptable reason for *your* work to look exactly like someone else's**.

you might find these useful

STEM Center: Assumption Hall 2nd floor, Sunday to Thursday afternoon and evenings. More info? 925.631.6282 athompson@stmarys-ca.edu

Student Disability Services: Filippi Academic Hall FAH190 925.631.4358 sds@stmarys-ca.edu

Student Engagement and Academic Success: Filippi Administrative Hall 925.631.4349 seas@stmarys-ca.edu

[1] See the Student Handbook for more information.
[2] Much like a reference in a paper.